

IN THE CLAIMS:

Please cancel claims 1-48, 53, 54 and 74 without prejudice or disclaimer, and amend claims 49, 58, 59, 75, 76, 78-83 and 87 as follows. This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1-48 (Canceled).

Claim 49 (Currently Amended): A method of fabricating a thin film transistor substrate for a display device, comprising:

- a first step of forming a gate line on a substrate;
- a second step of forming a gate insulating film covering the gate line;
- a third step of forming a semiconductor layer at a desired area on the gate insulating film;
- a fourth step of forming a data line crossing the gate line, a source electrode connected to the data line and a drain electrode opposed to the source electrode on the gate insulating film;
- a fifth step of forming a protective film in such a manner to cover the gate line, the data line, the source electrode and the drain electrode; and
- a sixth step of forming a pixel electrode making an interface with the protective film at the remaining area excluding an area where the protective film is formed and connected to a side surface of the drain electrode;

wherein said protective film is any one of an organic insulating film, an inorganic insulating film and an inorganic/organic insulating film having a double-layer structure, and wherein said sixth step includes:
coating a transparent conductive film formed into an amorphous substance on the protective film including an organic material while being formed into a crystalline substance at the remaining area formed from an inorganic material; and
selectively etching the amorphous transparent conductive film on the protective film using an etchant for amorphous substance to thereby leave only the crystalline transparent conductive film.

Claim 50 (Original): The method as claimed in claim 49, further comprising the steps of:

providing a gate pad lower electrode formed from the same material as the gate line;
providing a contact hole passing through the protective film and the gate insulating film to expose the gate pad lower electrode; and
providing a gate pad upper electrode formed from the same material as the pixel electrode and connected to the gate pad lower electrode through said contact hole.

Claim 51 (Original): The method as claimed in claim 49, further comprising the steps of:

providing a data pad lower electrode formed from the same material as the data line on

the gate insulating film;

providing a contact hole passing through the protective film to expose the data pad lower electrode; and

providing a data pad upper electrode formed from the same material as the pixel electrode and connected to the data pad lower electrode through said contact hole.

Claim 52 (Original): The method as claimed in claim 49, further comprising the step of: providing a storage upper electrode formed from the same material as the data line on the gate insulating film in such a manner to overlap with a portion of the gate line and making a side contact with the pixel electrode.

Claims 53 and 54 (Canceled).

Claim 55 (Original): The method as claimed in claim 49, further comprising a step of forming a crystallization catalyst layer at the remaining area excluding an area where the protective film is formed between said fifth step and said sixth step.

Claim 56 (Original): The method as claimed in claim 55, wherein said fifth step includes:

entirely forming the protective film on said substrate; and

patterning the protective film by an etching process using a photo-resist pattern formed

by the photolithography.

Claim 57 (Original): The method as claimed in claim 56, wherein said step of forming the crystallization catalyst layer includes:

entirely forming the crystallization catalyst layer on said substrate in which the photo-resist pattern is formed on the protective film; and

removing the crystallization catalyst layer on the photo-resist pattern along with the photo-resist pattern.

Claim 58 (Currently Amended): The method as claimed in claim 55, wherein said crystallization catalyst layer is formed such that metal atoms of at least one of refractory metals such as Ni, Cu, In, Sn, Mo, [[Tn,]] W, Cr and Hf have a distribution scattered on a sparsely basis.

Claim 59 (Currently Amended): A method of fabricating a thin film transistor substrate for a display device, comprising:

a first mask process of forming a gate line using a first mask after forming a gate metal layer on a substrate;

a process of disposing a gate insulating film, an amorphous silicon layer, an amorphous silicon layer doped with an impurity and a source/drain metal layer;

a second mask process of patterning the source/drain metal layer, the amorphous silicon layer doped with said impurity and the amorphous silicon layer using a second mask to thereby

provide a data line, a source electrode, a drain electrode and a semiconductor layer; a third mask process of etching out a protective film at a pixel area defined by an intersection between the gate line and the data line and the gate insulating film using a third mask after forming the protective film; and

a process of selectively etching out a transparent conductive film on the protective film after forming the transparent conductive film to thereby provide a pixel electrode making an interface with the protective film and connected to a side surface of the drain electrode;

wherein said step of forming the pixel electrode includes:

coating the transparent conductive film formed into an amorphous substance on the protective film including an organic material while being formed into at the remaining area formed from an inorganic material; and

selectively etching the amorphous transparent conductive film on the protective film using an etchant for amorphous substance to thereby leave only the crystalline transparent conductive film.

Claim 60 (Original): The method as claimed in claim 59, wherein said second mask process includes:

forming a photo-resist pattern having a different thickness on a source/drain metal layer using said partially transmitting mask;

patterning the source/drain metal layer, the amorphous silicon layer doped with said impurity and the amorphous silicon layer using the photo-resist pattern to thereby provide the

data line, the drain electrode integral to the source electrode and the semiconductor layer; ashing the photo-resist pattern to remove a relatively thin photo-resist pattern; disconnecting the source electrode from the drain electrode through a portion at which said thin photo-resist pattern is removed and removing the amorphous silicon layer doped with said impurity; and
removing the remaining photo-resist pattern.

Claim 61 (Original): The method as claimed in claim 59, further comprising the steps of:

providing a gate pad lower electrode formed from the same material as the gate line by the first mask process;

providing a contact hole passing through the protective film and the gate insulating film to expose the gate pad lower electrode by the third mask process; and

providing a gate pad upper electrode formed from the same material as the pixel electrode and connected to the gate pad lower electrode through said contact hole.

Claim 62 (Original): The method as claimed in claim 59, further comprising the steps of:

providing a data pad lower electrode formed from the same material as the data line on the gate insulating film by the second mask process;

providing a contact hole passing through the protective film to expose the data pad lower

electrode; and

providing a data pad upper electrode formed from the same material as the pixel electrode and connected to the data pad lower electrode through said contact hole.

Claim 63 (Original): The method as claimed in claim 59, further comprising the step of:

providing a storage upper electrode formed from the same material as the data line on the gate insulating film in such a manner to overlap with a portion of the gate line and making a side contact with the pixel electrode by the second mask process.

Claim 64 (Original): The method as claimed in claim 59, wherein said protective film is formed from an organic insulating film.

Claim 65 (Original): The method as claimed in claim 59, wherein said protective film is formed from an inorganic insulating film.

Claim 66 (Original): The method as claimed in claim 65, wherein said pixel electrode is formed to cover an area until the side surface of the inorganic insulating film.

Claim 67 (Original): The method as claimed in claim 59, wherein said protective film is formed from a double layer of an inorganic insulating film and an organic insulating film.

Claim 68 (Original): The method as claimed in claim 67, wherein said pixel electrode is formed to cover an area until the side surface of the inorganic insulating film.

Claim 69 (Original): The method as claimed in claim 61, wherein said gate pad upper electrode makes an interface with the protective film.

Claim 70 (Original): The method as claimed in claim 61, wherein said gate pad upper electrode is coated onto the side surface of the inorganic insulating film when the protective film includes the inorganic insulating film.

Claim 71 (Original): The method as claimed in claim 62, wherein said data pad upper electrode makes an interface with the protective film.

Claim 72 (Original): The method as claimed in claim 62, wherein said data pad upper electrode is coated onto the side surface of the inorganic insulating film when the protective film includes the inorganic insulating film.

Claim 73 (Original): The method as claimed in claim 62, wherein said contact hole is formed to pass through the data pad lower electrode such that the data pad upper electrode makes a side contact with the data pad lower electrode.

Claim 74 (Canceled).

Claim 75 (Currently Amended): The method as claimed in claim [[74]] 59, wherein the protective film including said organic material is formed from at least one of an acrylic organic compound, BCB and PFCB.

Claim 76 (Currently Amended): The method as claimed in claim [[74]] 59, further comprising the step of:

removing the organic material protective film making an interface with the crystalline transparent conductive film when the protective film is a built layer of the inorganic material protective film and the organic material protective film.

Claim 77 (Original): The method as claimed in claim 76, wherein said organic material protective film is made from an organic material including a photosensitive resin.

Claim 78 (Currently Amended): The method as claimed in claim [[74]] 59, further comprising the step of:

heating the substrate on which the protective film is formed at a temperature range of about 100°C to 200°C while coating the transparent conductive film.

Claim 79 (Currently Amended): The method as claimed in claim [[74]] 59, wherein

said transparent conductive film is formed to have a thickness of about 500 Å or less.

Claim 80 (Currently Amended): The method as claimed in claim [[74]] 59, wherein said pixel electrode is formed from at least one of ITO, TO, IZO and SnO₂.

Claim 81 (Currently Amended): The method as claimed in claim [[74]] 59, wherein an etching ratio of the amorphous transparent conductive film to the crystalline transparent conductive film is controlled by differentiating a content of an oxalic acid contained in the etchant for amorphous substance.

Claim 82 (Currently Amended): The method as claimed in claim [[74]] 59, wherein said etchant for amorphous substance contains an oxalic acid at a range of 3 to 5 weight%.

Claim 83 (Currently Amended): The method as claimed in claim [[74]] 59, wherein said pixel electrode makes a side contact with the drain electrode protruded toward said pixel area.

Claim 84 (Original): The method as claimed in claim 59, further comprising the step of: forming a crystallization catalyst layer at the remaining area excluding an area where the protective film is formed between said second mask process and said third mask process.

Claim 85 (Original): The method as claimed in claim 84, wherein said step of forming the protective film includes:

entirely forming the protective film on said substrate; and
patterning the protective film by an etching process using a photo-resist pattern formed by the photolithography.

Claim 86 (Original): The method as claimed in claim 85, wherein said step of forming the crystallization catalyst layer includes:

entirely forming the crystallization catalyst layer on said substrate in which the photo-resist pattern is formed on the protective film; and
removing the crystallization catalyst layer on the photo-resist pattern along with the photo-resist pattern.

Claim 87 (Currently Amended): The method as claimed in claim 84, wherein said crystallization catalyst layer is formed such that metal atoms of at least one of refractory metals such as Ni, Cu, In, Sn, Mo, [[Tn,]] W, Cr and Hf have a distribution scattered on a sparsely basis.